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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/567,577	02/08/2006	Kai Schumacher	284805US0X PCT	2526
22850	7590	10/07/2008	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			ZIMMER, ANTHONY J	
			ART UNIT	PAPER NUMBER
			1793	
			NOTIFICATION DATE	DELIVERY MODE
			10/07/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/567,577	<b>Applicant(s)</b> SCHUMACHER ET AL.	
	<b>Examiner</b> ANTHONY J. ZIMMER	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-6 and 8-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB'271 (GB1197271) in view of Mangold US'944.

In regard to claims 1 and 4, GB'271 teaches a process of purifying finely divided metal oxide particles formed by reaction of chlorides of the metals by hydrolytic or oxidizing gasses. See page 2, lines 56-72. GB'271 teaches adding metal oxide particles containing hydrogen chloride and chlorine (residues of halide compounds), see page 1, lines 38-45, together with waste (reaction) gasses (as indicated by the design choice to widen the reaction tube in response to the entrance of these gasses, see page 3, lines 1-7), to the top of a vertical reaction tube (column) in which the metal oxide falls due to gravity against a mixture of steam (a counter-current feed); see page 2, lines 56-72; the

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purified metal oxides being removed at the bottom of the column and the steam containing the halide residues are removed at the head (top) of the column; see page 3, lines 1-7 and 35-39. GB'271 teaches a temperature of 400-600°C in the column. See example 1.

GB'271 is silent in regard to the temperature difference between the bottom and the top of the column and the residence time of the particles.

However, in regard to the residence time, GB'271 does not indicate the density of the silicon dioxide used, which is needed to calculate the residence time. However, as indicated in Table 2 of Mangold, silicon dioxides produced by flame hydrolysis like the silica used in Example 1 of GB'271 and having similar surface areas to those as used in Example 1 of GB'271 have densities in the range of 25-32 g/L; thus the density of the silicon dioxide used in GB'271 would necessarily fall in this range; corresponding to a residence time of 2.9 - 3.7 minutes, according to the reaction parameters in GB'271 Example 1.

Basis of calculation:  $(\text{density of reactant})(\text{volume of reactor})/$

$(\text{rate of feed of reactant}) = \text{residence time}$

Furthermore, it would have been obvious to one of ordinary skill in the art to use the silicon dioxide particles of Mangold in the process of GB'271, if the density presented is not already inherent, because GB'271 teaches using metal oxide particles from a flame hydrolysis process (See page 1, lines 25-30), and Mangold is such a flame hydrolysis process producing silicon dioxide particles.

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In regard to the temperature difference, GB'271 teaches providing heat in two vertically adjacent burners located at the lower end of the treatment zone (the bottom). See page 3, lines 8-17. Thus, a temperature gradient would be produced, with a higher temperature at the bottom of the column and a lower temperature at the top. In a reaction column of sufficient size, like the 300 L tube used in Example 1, and with the feeding rates of Example 1, a temperature difference between the top of the column and the bottom of at least 20°C would necessarily be produced. Furthermore, the temperature profile of a continuous chemical system is a parameter that is routinely optimized in the chemical art, affecting the efficiency of the operation of the system, and fails to produce an unexpected result.

In regard to claim 2, GB'271 teaches providing heat in two vertically adjacent burners located at the lower end of the treatment zone (the bottom). See page 3, lines 8-17. Thus, a temperature gradient would be produced, with a higher temperature at the bottom of the column and a lower temperature at the top. In a reaction column of sufficient size, like the 300 L tube used in Example 1, with the feeding rates of Example 1, a temperature difference between the top of the column and the bottom of at least 20°C and in the range required by claim 2 would necessarily be produced. Furthermore, the temperature profile of a continuous chemical system is a parameter that is routinely optimized in the chemical art, affecting the efficiency of the operation of the system, and fails to produce an unexpected result. In particular regard to claim 2, regarding the upper limit of the temperature difference, it would have been obvious to one of ordinary skill in the art to optimize the temperature profile in the column in order to provide an

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upper limit in order to prevent undesirable effects on the product and in order to increase the safety of the reactor as sharp gradients within a reactor promote instability and produce undesirable results in the product.

In regard to claim 3, GB'271 teaches a reactor temperature of 400-600°C. See page 2, lines 96-99. Overlapping ranges are prima facie obviousness. See MPEP 2144.05.

In regard to claim 5, GB'271 is silent in regard to the temperature of the entering metal oxide particles. However, the particles provided to the deacidification process are from a flame hydrolysis or oxidizing process, high temperature processes (see page 1, lines 10-51 of GB'271). It would have been obvious to one of ordinary skill in the art after the hydrolysis or oxidizing process, to keep the metal oxide particles at a temperature near the operation temperature of the purification column (400-600°C) in order to affect the predictable result of decreasing the energy demand of the purification column and thus the cost.

In regard to claim 6, GB'271 teaches 12.5 Nm<sup>3</sup> of steam/ 154 kg of silica in example 1. The density of steam at this condition is 0.590 kg/m<sup>3</sup> (engineeringtoolbox.com). Thus, GB'271 teaches the amount of steam that is introduced is 0.048 kg/(hr) per kg of metal oxide particles.

In regard to claims 8, 9, and 10, GB'271 does not teach plural columns. However, depending on the desired quality of the product, the quality of the provided crude metal oxide particles, and the efficiency of the purification process, it would have been obvious to one of ordinary skill in the art to subject the metal oxide particles to a

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second purification process (i.e. passing the silica particles through another column), with the same conditions as the first, see claim 1 rejection above, in order to achieve the predictable result of producing a purer product.

In regard to claim 11, see above for the limitations of claim 2, GB'271 teaches a reactor temperature of 400-600°C. See page 2, lines 96-99. Overlapping ranges are prima facie obviousness. See MPEP 2144.05.

For the limitations of claims 12 and 13, see above for the limitations of claim 2 or 3; see claim 1 rejection above in regard to residence time.

In regard to claims 14-16, see above for the limitations of claim 2, 3, or 4. GB'271 is silent in regard to the temperature of the entering metal oxide particles. However, the particles provided to the deacidification process are from a flame hydrolysis or oxidizing process, high temperature processes (see page 1, lines 10-51 of GB'271). It would have been obvious to one of ordinary skill in the art after the hydrolysis or oxidizing process, to keep the metal oxide particles at a temperature near the operation temperature of the purification column (400-600°C) in order to affect the predictable result of decreasing the energy demand of the purification column and thus the cost.

In regard to claims 17-20, see above for the limitations of claim 2, 3, 4, or 5. GB'271 teaches 12.5 Nm<sup>3</sup> of steam/ 154 kg of silica in example 1. The density of steam at this condition is 0.590 kg/m<sup>3</sup>. Thus, GB'271 teaches the amount of steam that is introduced is 0.048 kg/(hr) per kg of metal oxide particles.

In regard to claim 21, GB'271 teaches a temperature of 400-600°C, and does not mention using a maximum temperature of 150°C. However, GB'271 teaches that

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temperatures of 200-500°C are effective. See page 1, lines 60-64. Though the given temperature does not fall in the given range, a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. See MPEP 2144.05. In the instant case, the temperature of 150°C is significantly close to the given range (and is a temperature at which necessary steam exists) that one skilled in the art would expect the temperature as being effective for purifying metal oxide particles.

Furthermore, temperature is a parameter routinely optimized in the chemical art. Selection of a temperature is a matter of design choice and routine optimization that fails to produce an unexpected result. In particular one of ordinary skill in the art would have been motivated to lower the temperature in order to decrease energy costs.

### ***Response to Arguments***

Applicant's arguments filed 7/17/2008 have been fully considered but they are not persuasive.

Applicant argues that the temperature difference is not greater than the cited temperature (20°C, a relatively small temperature difference), by arguing that GB'271 discloses the temperature of an introduced stream and the temperature through treatment zone.

However, neither of these temperatures cite actual temperatures at both ends of the treatment zone or the difference thereof. The "treatment zone" temperature (as cited



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by applicant) does not constitute a teaching of a constant temperature throughout the reactor (and nowhere in GB'271 is it indicated that this is the case) as it does not mention a top or a bottom temperature, and is more likely the average temperature of the whole reactor or the temperature at one location in the reactor as are common conventions when citing process parameters. Nowhere in GB'271, is it indicated that the top and the bottom of the reactor have the same temperature or a temperature difference less than 20°C. Furthermore, one of ordinary skill in the art would find that heating the reactor toward the lower end of the treatment zone (as noted in the rejection) would produce a temperature differential in the range of the claims. No evidence has been presented to the contrary, and attorney arguments cannot take the place of evidence in proving inoperability of the prior art. See also MPEP 716.01(c).

### ***Conclusion***

Applicant's amendment necessitated any new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. ZIMMER whose telephone number is (571)270-3591. The examiner can normally be reached on Monday - Friday 7:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ajz

/Steven Bos/  
Primary Examiner, Art Unit 1793